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0^s value rounded to 0 (zero) where there is a meaningful distinction between true zero and the value that was rounded
^{p} preliminary
^{r} revised
x suppressed to meet the confidentiality requirements of the *Statistics Act*
^{E} use with caution
F too unreliable to be published
* significantly different from reference category ($p < 0.05$)

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Smoking prevalence among Inuit in Canada

by Evelyne Bougie and Dafna Kohen

Abstract: Using data from the 1991, 2001 and 2012 Aboriginal Peoples Survey, this study examines the prevalence of smoking among Inuit aged 15 or older, by location of residence, sex and age group. Overall, the prevalence of daily smoking was significantly lower in 2012 than in 1991; this was true for Inuit living inside and outside Inuit Nunangat, for men and women, for most age groups, and for those in all Inuit regions except Nunavik. The average number of cigarettes smoked per day by daily smokers decreased steadily and significantly over time, except among those living outside Inuit Nunangat or in Nunavik, and those aged 55 or older. The average age of daily smoking initiation remained stable at 15.

Key words: Arctic, cigarette, Indigenous, tobacco, youth

Inuit are the original inhabitants of the Arctic. In 2011, the Inuit population of Canada totalled just under 60,000 individuals, 73% of whom lived in remote communities in the four regions collectively known as Inuit Nunangat: Nunatsiavut (Labrador); Nunavik (northern Quebec); Nunavut; and the Inuvialuit Settlement Region (Northwest Territories).[1]

Inuit face unique challenges in terms of physical and mental health.[2,3] Included among these challenges is a high prevalence of smoking.[2-7] According to the 2012 Aboriginal Peoples Survey (APS), 52% of Inuit aged 15 or older smoked cigarettes daily—more than three times the rate (16%) of the total population of Canada.[4]

Smoking-related diseases account for the largest percentage of the difference in female life expectancy between residents of Inuit Nunangat and the rest of Canada.[8] Lung cancer is the most common cancer in Nunavut[9]; in fact, Inuit have the highest incidence of lung cancer in the world.[10,11]

Given the well-established relationship between tobacco smoking and a variety of adverse health effects[12] and premature death,[13] smoking patterns among Inuit merit examination. Based on results of the 1991, 2001 and 2012 APS (see *The data*), this study examines trends in daily smoking, occasional smoking and non-smoking among Inuit aged 15 or older, by selected characteristics (inside/outside Inuit Nunangat, Inuit region, sex and age group). Change is measured by comparing estimates over 20 years (1991 to 2012) and over each 10-year interval (1991-to-2001 and 2001-to-2012). For daily smokers, the average number of cigarettes smoked per day and the average age of daily smoking initiation are also investigated.

National trends

Between 1991 and 2012, the prevalence of daily smoking among Inuit decreased significantly from 64% to 52% (Table 1). Relatively little change occurred between 1991 and 2001, but the drop thereafter was significant: from 61% in 2001 to 52% in 2012. At the same time, the percentage of all Canadians aged 15 or older who were daily smokers also declined—from 22% in 2001 to 16% in 2012.[14]

Occasional smoking was more common among Inuit in 2012 than in 1991. The percentage did not change significantly between 1991 and 2001, but rose between 2001 and 2012.

The prevalence of non-smoking among Inuit was significantly higher in 2012 (38%) than in 1991 (29%). The percentage of non-smokers increased steadily and significantly throughout the two decades.

More prevalent inside Inuit Nunangat

During the entire period, daily smoking was consistently and significantly more prevalent among Inuit living inside than outside Inuit Nunangat. The percentage of daily smokers decreased significantly in both areas, but the decline was more pronounced outside Inuit Nunangat (down 20 percentage points versus 5 percentage points). Both inside and outside Inuit Nunangat, the percentage who smoked daily was relatively stable between 1991 and 2001, but had dropped significantly by 2012.

Daily smoking in the four Inuit regions

Over the two decades, daily smoking decreased significantly in Nunavut, the Inuvialuit Settlement Region and Nunatsiavut. However, between 1991 and 2001, daily smoking prevalence in these regions did not change significantly. During the next decade, a significant decline was apparent only in the Inuvialuit Settlement Region.

Throughout the two decades, the prevalence of daily smoking was significantly lower in Nunatsiavut than in the other Inuit regions. In 2012, daily smoking prevalence was significantly higher in Nunavik and Nunavut than in the other two Inuit regions.

In Nunavik, the percentage of daily smokers rose significantly between 1991 and 2001, but by 2012 had fallen back to the 1991 level.

Declines in most age groups

Between 1991 and 2012, daily smoking declined significantly for Inuit in all age groups except 45 to 54. Changes from 1991 to 2001 did not reach statistical significance for any age group.

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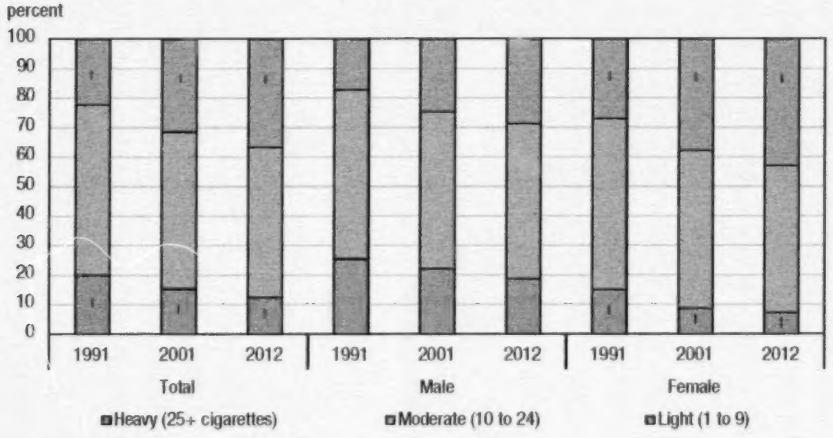
Table 1
Prevalence of daily, occasional and non-smoking, by Inuit region, Inuit population aged 15 or older, Canada, 1991, 2001 and 2012

	1991			2001			2012		
		95% confidence interval			95% confidence interval			95% confidence interval	
Region and type of smoker	%	from	to	%	from	to	%	from	to
Total									
Daily smoker	64†	62	66	61	59	64	52†	50	55
Occasional smoker	7†	6	9	6	5	7	9†	8	11
Non-smoker	29†	27	31	32†	30	35	38†	36	41
Outside Inuit Nunangat									
Daily smoker	49†	46	52	43	35	50	29‡	23	36
Occasional smoker	7	5	8	6‡	4	10	8‡	5	11
Non-smoker	44†	41	47	51	44	58	64†	57	70
Inside Inuit Nunangat									
Daily smoker	68†	66	69	67	66	69	63†	60	65
Occasional smoker	8†	7	9	6†	5	7	10†	9	12
Non-smoker	25	23	26	27	25	28	27	25	29
Nunavut									
Daily smoker	69†	67	71	67	65	69	63	60	66
Occasional smoker	8‡	7	9	6†	5	7	10†	8	12
Non-smoker	23†	21	25	28†	26	30	27	24	30
Nunavik									
Daily smoker	67	65	69	74†	71	77	67†	63	70
Occasional smoker	7†	6	7	4†	3	6	10†	8	12
Non-smoker	27	25	28	22†	19	24	24	21	27
Inuvialuit Settlement Region									
Daily smoker	67†	65	68	65	60	70	57†	53	62
Occasional smoker	9†	8	10	10	8	14	13	10	16
Non-smoker	25†	23	26	24	21	29	30	26	34
Nunatsiavut									
Daily smoker	56†	55	58	50	44	56	50	46.1	54.8
Occasional smoker	9	8	10	12‡	8	17	11	8.7	14.1
Non-smoker	35	33	37	38	32	45	38	34.3	42.7

† significantly different from 2012 ($p < 0.05$)
‡ significantly different from preceding period ($p < 0.05$)
E use with caution
Sources: 1991, 2001 and 2012 Aboriginal Peoples Survey.

Figure 1
Percentage distribution of heavy, moderate and light smoking among Inuit daily smokers, by sex, Inuit population aged 15 or older, Canada, 1991, 2001 and 2012



† significantly different from total moderate smoking ($p < 0.05$)
‡ significantly different from male ($p < 0.05$)
Sources: 1991, 2001 and 2012 Aboriginal Peoples Survey.

but from 2001 to 2012, declines were significant for those aged 15 to 24, 35 to 44, and 65 or older (Table 2). Decreases over the entire 1991-to-2012 period were greatest for the 55-to-64 and 65-or-older age groups.

In the general Canadian population, the prevalence of smoking is lowest at the extremes of the age range.[15] Among Inuit, in 2012, the prevalence of daily smoking was lowest at age 65 or older, followed by ages 55 to 64. Prevalence was similar among all age groups from 15 through 54, except that 25- to-34-year-olds were significantly more likely than 15- to-24-year-olds to be daily smokers (62% versus 55%).

Inuit men and women equally likely to report daily smoking

The prevalence of daily smoking was similar among Inuit men and women throughout the two decades. This contrasts with the general Canadian population, among whom men are more likely than women to smoke daily or occasionally.[15]

Daily smoking trends among Inuit men and women followed the overall pattern, in that prevalence was significantly lower in 2012 than in 1991, with a significant decline occurring only between 2001 and 2012 (Table 2).

Cigarettes smoked per day

Smoking can be classified as "heavy," "moderate" or "light," based on the number of cigarettes smoked per day. Throughout the two decades, Inuit who were daily smokers were significantly more likely to be "moderate" (10 to 24 cigarettes per day) than "heavy" (25 or more) or "light" (1 to 9) smokers (Figure 1). Among those who smoked daily, women were significantly more likely than men to be light smokers, while men were significantly more likely to be heavy smokers.

The number of cigarettes smoked per day has been shown to be negatively associated with cessation—heavy smokers are less likely than light smokers to quit.[16] The average number of cigarettes smoked per day by Inuit daily

Table 2
Prevalence of daily, occasional and non-smoking, by sex and age group, Inuit population aged 15 or older, Canada, 1991, 2001 and 2012

Sex, age group and type of smoker	1991	95% confidence interval		2001	95% confidence interval		2012	95% confidence interval	
	%	from	to	%	from	to	%	from	to
Sex									
Male									
Daily smoker	64[†]	62	66	62	59	65	51[†]	47	55
Occasional smoker	8	7	9	7	5	8	10[†]	8	11
Non-smoker	29[†]	27	31	31	29	34	39[†]	35	44
Female									
Daily smoker	64[†]	62	66	61	57	64	53[†]	49	57
Occasional smoker	7	6	8	6	4	7	9[†]	7	12
Non-smoker	28[†]	26	30	33[†]	30	37	38	34	41
Age group									
15 to 24									
Daily smoker	65[†]	63	67	66	62	69	55[†]	51	60
Occasional smoker	8[†]	7	9	7	6	9	12[†]	9	15
Non-smoker	27[†]	26	29	27	24	30	33[†]	28	38
25 to 34									
Daily smoker	69[†]	67	71	66	59	71	62	58	66
Occasional smoker	8[†]	6	9	5[‡†]	4	7	12[†]	9	16
Non-smoker	23	21	25	29	23	36	26	22	30
35 to 44									
Daily smoker	65[†]	63	67	66	61	70	56[†]	50	62
Occasional smoker	9	8	10	6[‡]	4	8	7	5	10
Non-smoker	26[†]	24	28	28	24	33	37[†]	30	43
45 to 54									
Daily smoker	61	59	63	55	47	63	60	52	68
Occasional smoker	4[†]	4	5	7[‡]	4	12	10[‡]	7	15
Non-smoker	34	32	36	38	31	45	30	22	38
55 to 64									
Daily smoker	51[†]	49	53	43	36	51	34	24	46
Occasional smoker	7	6	8	4[‡†]	2	7	5[‡]	3	10
Non-smoker	42[†]	40	44	53[†]	45	61	61	49	72
65 or older									
Daily smoker	42[†]	40	44	35	29	43	12[‡†]	7	19
Occasional smoker	6	5	7	6[‡]	3	10	F	...	...
Non-smoker	51[†]	49	53	59	51	66	85[†]	77	90

... not applicable
[†] use with caution
F too unreliable to be published
[‡] significantly different from 2012 ($p < 0.05$)
[‡] significantly different from preceding period ($p < 0.05$)
Sources: 1991, 2001 and 2012 Aboriginal Peoples Survey.

smokers fell significantly from 14.9 in 1991 to 13.3 in 2001 and to 12.3 in 2012. The decrease was significant among those living inside Inuit Nunangat, among men and women, and among all age groups from 15 through 54. The average number of cigarettes smoked per day did not change significantly among those living outside Inuit Nunangat or in Nunavik, or among Inuit aged 55 or older (Table 3).

Age of daily smoking initiation

For most smokers, daily smoking begins in their teens.[17] The average age of daily smoking initiation reported by Inuit daily smokers remained stable at 15.1 in 2001 and 15.2 in 2012 (data not available for 1991). A change was apparent in Nunavut, where daily smokers reported starting smoking daily at a significantly older age in 2012 (15.4) than in 2001 (14.9). As well, in 2012, 15- to 24-year-olds who were daily smokers reported that they started smoking daily at an average age of 14.2, which was significantly older than the average reported by daily smokers who had been aged 15 to 24 in 2001—13.7 (Table 3).

Conclusions

Aboriginal Peoples Survey data show that the prevalence of daily smoking among Inuit, while much higher than among the Canadian population overall, decreased between 1991 and 2012. Nonetheless, the prevalence of daily smoking was particularly elevated in Inuit Nunangat. Inuit men and women were equally likely to report smoking daily, but Inuit men were more likely to report heavy smoking. Research seeking to understand smoking initiation and smoking behaviour among Inuit from a social determinants perspective[3] could further inform cessation and prevention programs for this population group. ■

Acknowledgments

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Table 3
Average number of cigarettes smoked per day and average age of daily smoking initiation, by region, sex and age group, Inuit daily smokers aged 15 or older, Canada, 1991, 2001 and 2012

	Average number of cigarettes smoked per day									Average age of smoking initiation					
	1991			2001			2012			2001			2012		
		95% confidence interval			95% confidence interval			95% confidence interval			95% confidence interval			95% confidence interval	
Region, sex and age group	Number	from	to	Number	from	to	Number	from	to	Age	from	to	Age	from	to
Total	14.9[†]	13.4	16.4	13.3[†]	12.8	13.7	12.3[†]	11.8	12.8	15.1	14.9	15.3	15.2	14.8	15.5
Region															
Outside Inuit Nunangat	16.6	14.3	18.9	16.5	14.7	18.3	14.1	11.9	16.3	16.1	15.3	16.9	15.3	14.0	16.6
Inside Inuit Nunangat	14.6[†]	13.2	16.0	12.6[†]	12.3	12.9	11.9[‡]	11.5	12.4	14.9	14.7	15.1	15.1	14.8	15.4
Nunavut	14.5[†]	13.0	15.9	12.0[†]	11.5	12.4	11.5	10.8	12.1	14.9	14.6	15.1	15.4[†]	14.9	15.8
Nunavik	14.3	13.0	15.6	13.7	13.1	14.3	12.9	12.4	13.5	14.6	14.3	14.9	14.3	14.0	14.6
Inuvialuit Settlement Region	15.1[†]	13.6	16.5	12.7[†]	11.8	13.6	11.3[‡]	10.5	12.1	15.5	14.8	16.2	15.1	14.7	15.5
Nunatsiavut	16.5[†]	15.1	17.9	15.3	13.9	16.7	13.7	12.6	14.9	15.8	15.1	16.5	15.6	15.1	16.1
Sex															
Male	16.6[†]	15.0	18.1	14.9	14.2	15.7	14.2	13.2	15.2	15.1	14.9	15.4	15.3	14.8	15.9
Female	13.4[†]	11.9	14.8	11.7[†]	11.2	12.1	10.8[‡]	10.3	11.3	15.1	14.7	15.4	15.0	14.6	15.4
Age group															
15 to 24	13.0[†]	11.7	14.4	10.8[‡]	10.3	11.3	10.1	9.5	10.7	13.7	13.5	14.0	14.2[†]	13.9	14.4
25 to 34	15.3[†]	13.8	16.8	13.1[‡]	12.5	13.7	11.2[‡]	10.5	11.9	14.7	14.4	15.1	14.4	14.1	14.7
35 to 44	16.8[†]	15.3	18.4	14.7[‡]	13.7	15.7	14.4	12.7	16.1	15.6	15.1	16.2	15.2	14.8	15.7
45 to 54	16.9[†]	15.3	18.4	16.5	14.4	18.5	14.6	13.1	16.0	16.5	15.7	17.3	16.6	15.6	17.6
55 to 64	15.8	14.3	17.3	15.7	13.6	17.9	13.7	11.7	15.7	18.6	17.0	20.3	16.6	13.9	19.2
65 or older	15.5	14.1	16.9	14.7	11.8	17.6	13.3	10.2	16.3	20.0	17.3	22.6	24.3[†]	13.7	35.0

[E] use with caution
[†] significantly different from 2012 ($p < 0.05$)
[‡] significantly different from preceding period ($p < 0.05$)
Note: Data on age of smoking initiation were not collected in 1991.
Sources: 1991, 2001 and 2012 Aboriginal Peoples Survey.

The data

The data are from the 1991, 2001 and 2012 Aboriginal Peoples Survey (APS), a national cross-sectional survey of First Nations people, Métis and Inuit conducted by Statistics Canada. Residents of institutions are excluded. The response rates were 79% in 1991, 84% in 2001, and 76% in 2012.

The survey methodology differed. The 1991 and 2001 APS were conducted in selected First Nations communities (reserves), whereas the 2012 APS excluded people living on Indian reserves and settlements as well as in certain First Nations communities in Yukon and the Northwest Territories. The 1991 sample was derived from the census population who self-reported Aboriginal *origins* and who also self-identified as Aboriginal in the APS. The 2001 and 2012 samples were from the census (or National Household Survey in 2012) population who self-reported Aboriginal *identity* or *ancestry*, and who also self-identified as Aboriginal in the APS. It is not known if differences in survey methodology affected trends in results.

The sample for the present study consisted of APS respondents who: self-identified as Inuit, were aged 15 or older, and provided smoking data. The percentages with missing smoking data were about 1% in 1991, 2% in 2001 and 7% in 2012. To overcome differences in survey methodolgy, respondents who self-identified as Inuit, but who lived on a reserve in 1991 or 2001, were excluded from the analysis. Inuit of the Western Arctic are known as "Inuvialuit"; in this report, the term "Inuit" includes Inuvialuit. The study sample sizes were 6,669 in 1991; 4,993 in 2001; and 3,429 in 2012.

The smoking status question was the same in all survey years: *"At the present time do you smoke cigarettes daily, occasionally, or not at all?"* Daily smokers were asked: *"How many cigarettes do you smoke each day now?"* In 2001 and 2012, daily smokers were also asked: *"At what age did you begin to smoke cigarettes daily?"*

Sampling weights were applied to all analyses, and a bootstrapping technique was used when calculating estimates of variance for the 2001 and 2012 APS. No bootstrap weights were developed for the 1991 APS; variance was calculated using a design effect adjustment of 1.5 for Inuit.[18] Significance tests (z-tests at $p < 0.05$) were performed to evaluate change over time by comparing estimates in 1991 with those in 2001; 2001 with 2012; and 1991 with 2012. Estimates with coefficients of variation greater than 16.6% but less than or equal to 33.3% should be interpreted with caution; these are noted (E) in the tables. Estimates with coefficients of variation greater than 33.3% or with small counts (less than 10) were suppressed.

Accurate estimates of the prevalence of cigarette smoking among Canadians overall can be derived from self-reported data,[19] but the validity of self-reported smoking data has not been determined for Inuit specifically. It is not known if smoking trends over time would be affected by social desirability biases. Another source of bias in self-reported smoking status could have been introduced by proxy reporting. Finally, because the data are based on three separate cross-sectional surveys, differences in smoking behaviour over time may reflect differences between cohorts.

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